

REMARKS

In the Patent Office Action mailed 6/18/01, the examiner rejected all pending claims, 2 – 30, for the following reasons.

(1) Double Patenting relative to claims 1 – 16 of U.S. Patent No. 5,735,966.

(2) Anticipation under 35USC#102 on the following.

- Yoshida, U.S. 5,421,908
- Yoshida, U.S. 5,626,686
- Grimmer, U.S. 5,385,848

Double patenting Rejections

The terminal disclaimer filed herewith (P.O. Form PTO/SB/26) is intended to remove the double patenting rejection.

35USC#102 Rejections

The two Yoshida references cited (U.S. 5,421,908 and U.S. 5,626,686) present similar teachings. In order to facilitate demonstration of the differences between the claims of the instant application, as amended, and the Yoshida teachings, applicant submits Appendix A and Appendix B attached. Appendix A is an expansion of the FIG.12a embodiment of U.S. 5,421,908. Appendix B is an expansion of FIG. 1c of U.S. 5,626,686. Both structural arrangements are similar, and applicant argues that these expanded embodiments reflect the essential Yoshida teachings as they are relevant to the claims of the instant application.

In Appendix, four of the series connected photovoltaic cells as taught are shown. The cells comprise first electrode 2, semiconductor layer 3, and second electrode 4. The substrate comprises insulating material 1 and third electrode 5. Electrical connection between second electrode 4 and third electrode 5 is made through holes 6. Electrical connection between third electrode 5 and first electrode 2 is made through holes 61.

Current flow (left to right) in the expanded Appendix A embodiment is as follows.

- (1) First electrode 2 of cell 1 to semiconductor 3 of cell 1.
- (2) Semiconductor 3 of cell 1 to second electrode 4 of cell 1.
- (3) Second electrode 4 of cell 1 through hole 6 to third electrode 5.
- (4) Third electrode 5 through hole 61 to first electrode 2 of cell 2.

While the numbers are different, essentially the same structural arrangement is embodied in Appendix B attached.

In Appendices A and B, the width of the individual cells, as required by the limitations of the claims of the instant application is shown as the distance between grooves 91. The first and second terminal edges of the cells, as required by the limitations of the claims of the instant application, are also indicated. The width dimension of the conductive substrate regions, as required by the limitations of the claims of the instant application, is also indicated as the distance between grooves 93.

Using the embodiments of Appendices A and B, the individual independent claims of the instant application, as amended, will be addressed.



Claim 2

A fundamental limitation of amended claim 2 is that a line drawn on the conductive top surface between the terminal edges of the conductive top surface, as defined, intersect a cell terminal edge of at most a single cell. Referring to Appendices A and B, it is clearly seen that such a line intersects a terminal edge of two individual cells. Indeed, the Yoshida structure requires that the width line of a conductive top surface of the conductive substrate region intersect a terminal edge of multiple cells because the connections from a first cell top electrode and an adjacent cell base electrode travel vertically to a common conductive substrate region.

The combination defined in amended claim 2 also clearly differs from the structure taught by Grimmer '848. If the "substrate structure" of claim 2 were to be considered components 15, 16, 19, 17, 20, 14 and 18 of Grimmer, then regions 20 would have to constitute the "conductive substrate regions" of the instant claim 2. However, in that case the "conductive surface width line" as defined by the claim 2 would intersect terminal edges of two cells, a condition outside the limits of amended claim 2. If on the other hand the "substrate structure" of amended claim 2 were to be considered components 15 and 16 of Grimmer, the substrate would not comprise "one or more conductive substrate regions" as required. Finally, if the "substrate structure of amended claim 2 were to be considered components 15, 16, 10, 19, 17, 20, 14 and 18 of Grimmer, then the limitation "said bottom surface of said cell foil of a second of said cells being attached to said non-

conductive surface of a first of said insulating substrate regions” would not be met. Thus, no matter how one interprets the Grimmer structure, claim 2 as amended is distinguishable.

Claim 7

Claim 7 contains a fundamental limitation that the cells are initially separate and distinct from the substrate structure. There is no way to interpret the cell/substrate combinations taught by Yoshida as being initially separate and distinct, since the very first step in the Yoshida manufacturing process is to deposit first electrode 2 (part of the cells as defined) onto the insulating material 1 (part of the substrate as defined). See Yoshida, U.S. 5,421,908, FIG.s 6a – 6g.

Regarding Grimmer, U.S. 5,385,848, individual cells (10, 11, 12, 13) are originally separate and distinct from the substrate (15, 16). However, in this case the substrate (15, 16) structure does not comprise one or more electrically conductive substrate regions as required by claim 7 of the instant application.

Claim 11

Claim 11, as amended, is not anticipated by either of the Yoshida references for the reasons discussed in regard to amended claim 2. Amended claim 11 is not anticipated by Grimmer, U.S. 5,385,848 because Grimmer does not have “at least a portion of said bottom surface of said supporting cell foil of a first of said cells attached to said first of said conductive substrate regions and having at least a portion of said bottom surface of

said supporting cell foil of a second of said cells being attached to said non-conductive substrate region”.

Claim 19

Claim 19, as amended, is not anticipated by Yoshida patents ‘908 or ‘686 for the reasons discussed above relating to claim 2.

Claim 19, as amended, is not anticipated by Grimmer ‘848. Claim 19 requires that the cell foil thickness be between .001 cm and .025 cm. The metal layer 11 is taught by Grimmer in the ‘848 patent to range in thickness from 0.4 to 3 micron (Column 3, lines 57 – 60). This is 5 to 25 times thinner than the minimum .001 cm. called out in amended claim 19. Thus, an interpretation that foil 11 of Grimmer ‘848 corresponds to the amended claim 19 “cell foil” and that structure 10 of Grimmer corresponds to amended claim 19’s “conductive substrate regions” is not proper. Alternatively, an interpretation that metal foil 10 of Grimmer ‘848 corresponds to the amended claim 19’s “cell foil” is improper. In that case, the Grimmer structure would not meet the instant claim 19’s limitation that the combination be “characterized by having said bottom surface of said foil of a first of said cells attached to a first of said electrically conductive substrate surfaces”.

Claim 22

Claim 22 is distinct and not anticipated by Grimmer '848 or either of the Yoshida patents '908 and '686. In the case of Grimmer, the structure combining 10, 15, 16 of the '848 patent could be interpreted as the contiguous electrically conductive and electrically insulating regions of the substrate structure and further that 11 be the metal-based foil supporting structure. However, in that case, the structure would not meet the additional claim 22 limitation as having the "supporting structure of a second of said cells joined to said insulating region of said first of said units".

Regarding Yoshida patents '908 and '686, the instant claim 22 requires the recited combination to be "substantially devoid of holes extending through said support structure...", clearly distinguishing the instant claim 22 from Yoshida.

Claim 27

Claim 27 calls for adjacent cell positioning on the substrate such that there is a gap therebetween, and holes extending from the top to bottom substrate surfaces within the gap. These limitations clearly distinguish the instant claim 27 from Grimmer '848.

Regarding the Yoshida patents '908 and '686, applicant again refers to Appendix A attached which shows the essential structure taught by Yoshida. It is clearly seen that no holes extend through the substrate in the gaps "91" separating adjacent cells. Indeed, even if holes were to exist in the gaps "91" taught by Yoshida, they would serve

absolutely no function. Applicant thus avers that the structure of instant claim 27 is not anticipated or taught by Yoshida.

On the basis of the above remarks, applicant believes independent claims 2, 7, 11, 19, 22, and 27, as amended by the instant amendment, as well as the claims that depend from them, are distinct and patentable over the prior art. Allowance is respectfully requested.

Respectfully submitted,

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